

Identification and characterization of a subtelomeric satellite DNA in Callitrichini monkeys

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Abstract/Resumo

Repetitive DNAs are abundant fast evolving components of eukaryotic genomes, which often possess important structural and functional roles. Despite their ubiquity, repetitive DNAs are poorly studied when compared to the genic fraction of genomes. Here, we took advantage of the availability of the sequenced genome of the common marmoset *Callithrix jacchus* to assess its satellite DNAs (satDNAs) and their distribution in Callitrichini. Firstly, we performed similarity-based clustering, repeat identification, and classification using RepeatExplorer with whole-genome shotgun Illumina reads from a male *C. jacchus*. After clustering analysis, we identified a satDNA composed by 171 bp motifs, named MarmoSAT, which composes 1.09 % of the *C. jacchus* genome. Multiple sequence alignments were performed using Muscle 4.0. The MEGA software version 5.05 was used for the calculation of genetic distances and construction of Neighbor-Joining (NJ) trees. Chromosome preparations were obtained from fibroblast cultures of one male of each *C. penicillata*, *C. geoffroyi*, *Callimico goeldii* and *Mico argentatus*. We performed CBG-banding and fluorescence *in situ* hybridization (FISH) using alpha and MarmoSAT satDNAs and telomeric sequences as probes. Finally, we investigated the transcription of MarmoSAT in several tissues of *C. jacchus* using the RNA-seq data generated by the Non-Human Primate Reference Transcriptome Resource. FISH on chromosomes of species from Callitrichini showed that MarmoSAT had a subtelomeric location. In addition to the common monomeric form we found that MarmoSAT was also organized in higher-order repeats of 338 bp in *C. goeldii*. Our phylogenetic analyses showed that MarmoSAT repeats from *C. jacchus* lack chromosome-specific features, suggesting exchange events among subterminal regions of non-homologous chromosomes. MarmoSAT is transcribed in several tissues of *C. jacchus*, with the highest transcription levels in spleen, thymus and heart. The transcription profile and subtelomeric location suggest that MarmoSAT may be involved in the regulation of telomerase and modulation of telomeric chromatin.

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